Hake MSE status update and work plan

December 14, 2017

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Reminder: What is MSE? A process…

- Simulates the entire management process
  - Data collection
  - Assessment
  - Application of harvest control rules
  - Effect of removals on population dynamics

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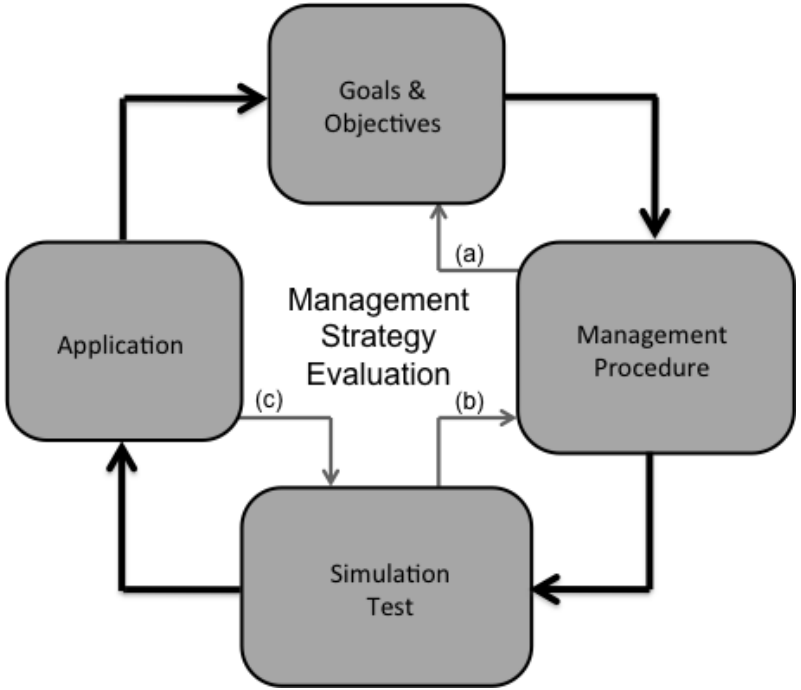


Reminder: Why do a MSE?

- Improve and support decision-making
- Testing the performance of management procedures (data collection, assessment, application of harvest strategies)
  - Over many simulated years
  - Over scenarios capturing “things we can’t control”, e.g. a range of potential future ocean conditions
- Test potential changes in management procedures first in a virtual world, before considering implementing them the real world

Reminder: Why do the Hake MSE?

- Use the MSE to provide qualitative guidance to the SRG, AP, and JMC when considering management advice.
  - This is how the MSE has somewhat been used to date
- Use the MSE to develop a management procedure.
  - A management procedure consists of the combination of monitoring, stock assessment, and the harvest control rule, and is more than what is defined by The Agreement (the Agreement can be thought as defining a harvest rate and control rule).

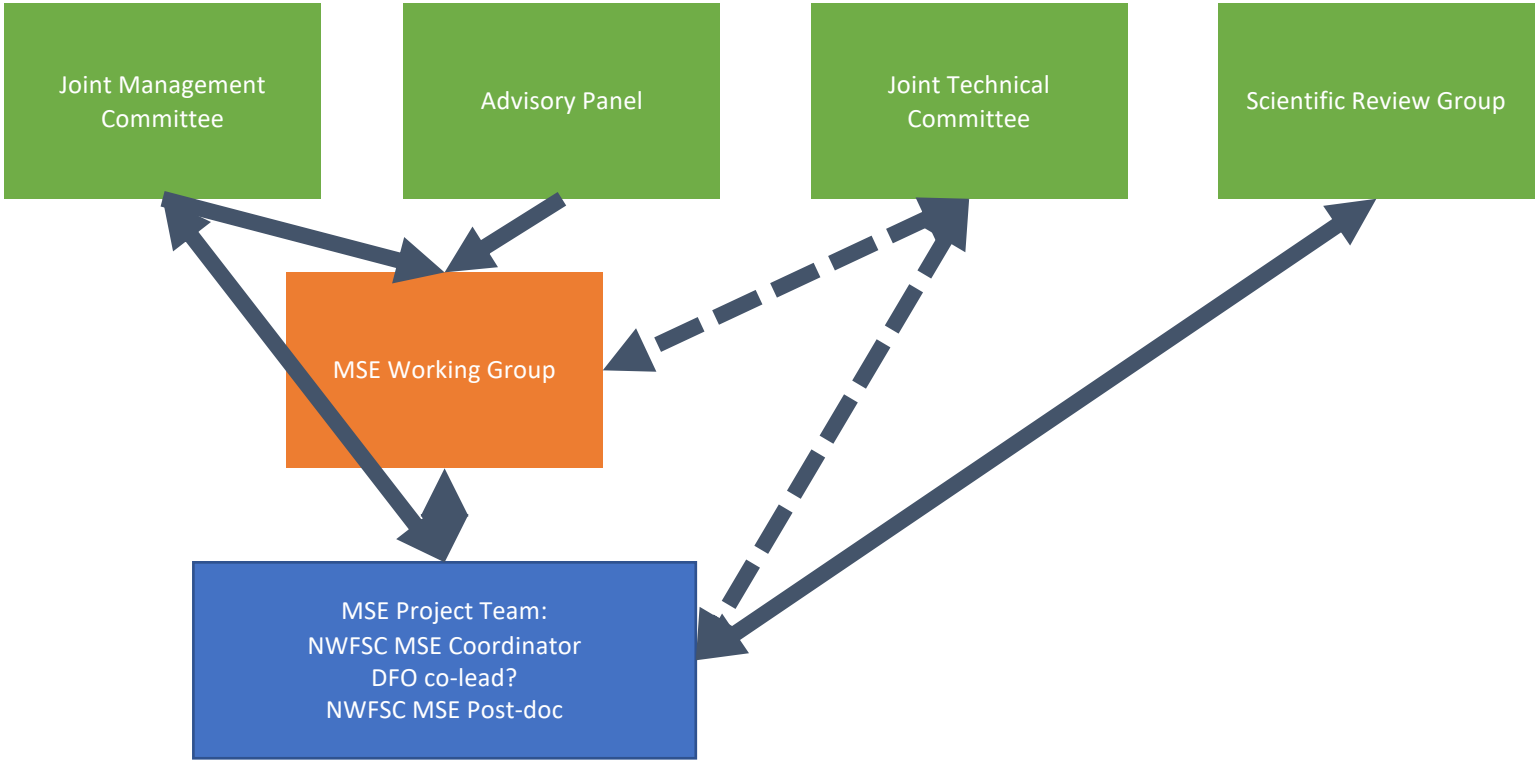
Hake MSE related personnel/resources update

- NOAA Fisheries and the Environment (FATE) funded project: Short-term forecasting of Pacific hake distribution in the California Current Ecosystem, Lead PI Mary Hunsicker, NWFSC post-doc Mike Malick

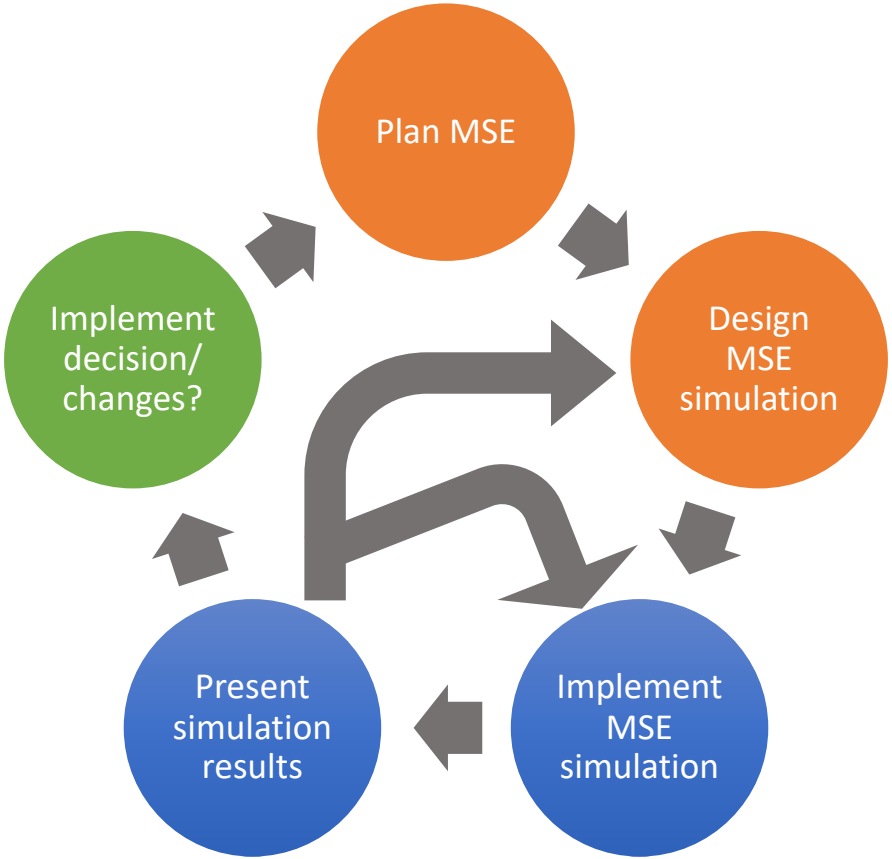
- NWFSC MSE coordinator – Kristin Marshall

- NWFSC post-doc starting Jan 2018 – Nis Jacobsen

Proposed communication process for MSE



Workplan for this iteration of Hake MSE (thru Dec 2019)


Plan MSE
Design MSE simulation
Implement MSE simulation
Present simulation results
Implement decision/ changes?

Plan and Design I (thru March 2018)

1. Establish project team and MSE Work group, roles and responsibilities, communication strategies, work plan (by March 2018)
2. **Establish goals for this iteration of the MSE** (What problem are we trying to address?) (by March 2018)

Deliverables: preliminary review/discussion with MSEWG in Jan, and review by SRG/JMC in Feb/March

Plan and Design II – thru Aug 2018

3. **Review goals and objectives of managers with feedback from MSE working group**
4. **Review performance metrics with feedback from MSE working group**
5. Develop environmental scenarios
6. Identify other types of scenarios (?)
7. Develop operating and estimation models

Deliverables: preliminary review/discussion with MSEWG in Jan, and conceptual model review by SRG/JMC in Feb/March

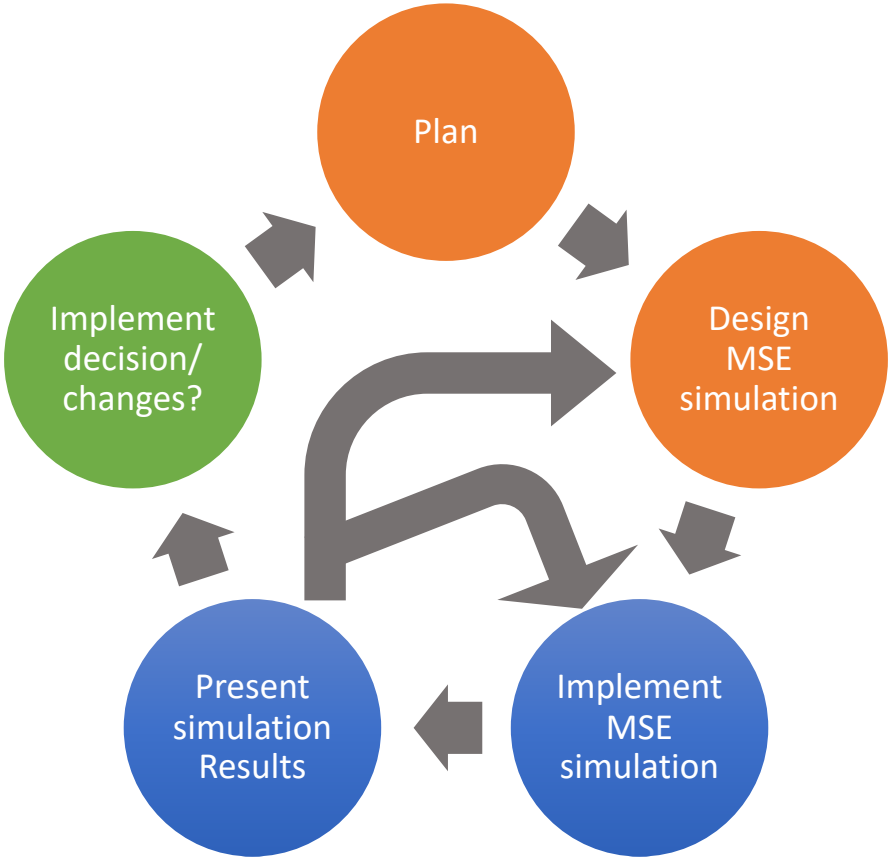
Implement MSE simulation – thru Dec 2018

8. Develop computer code for closed loop simulation
9. Parameterize operating models
10. Simulate each management strategy with the operating model and summarize and interpret performance metrics
11. Develop communication tools for simulation results

12. Present simulation results

- *Deliverables:*
  - *First iteration, with non-conditioned model – Aug 2018*
  - *Second iteration, with conditioned model – Feb/March 2019*
  - *Third iteration, with conditioned model – Aug 2019*

13. Technical documentation of results – by Dec 2019


Plan
Design MSE simulation
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Proposed timeline

Potential issues for discussion today:

- Objectives for this iteration of the MSE
- Management objectives (review previous)
- Performance metrics (review previous)
- Initial discussion on how to implement fishing ?

Objectives for previous iterations of the MSE:

- Defining objectives of the fishery and performance metrics,
- Developing understanding of short-term and long-term implications of harvest control rules for Pacific hake (MSC certification motivation-conservation performance of the harvest strategy).
- Explore importance of sampling and shifts in sampling (age 1 index of abundance)
- Explore how a shift in age structure toward younger fish limits biomass of older hake in Canada

Proposed objectives for this iteration of MSE:

- Understand how fishing in each country affects the availability of fish to the other country in future years
- Understand the effects of hake distribution and movement on both countries ability to catch fish
- Evaluate the performance of the current management procedure under current and future environmental scenarios
- Others???

Definition of management objectives to evaluate management procedures:

- We need to define operational objectives, which require at least three components
  - A target or threshold value
  - Time horizon
  - An acceptable probability of either achieving that target or avoiding a threshold
- The JTC (2015) previously proposed some questions that could be used to develop operational objectives and guide the development of an operating model

Objectives translated from the Agreement (2015)

- Aspirational Objective 1: The offshore Pacific Hake resource is above a certain threshold to allow for a sustainable population and sufficient numbers in a diversity of age classes. A threshold may be defined as a level that does not impair recruitment.

- Aspirational Objective 2: Both parties can achieve their intended benefits.

Previous questions (2015):

- Stock Status
  - What is the desired status of the stock (i.e., abundance)?
  - What is the desired age structure?
  - What is the desired proportion/availability of biomass or numbers in each country?
- Yield
  - What is the desired level of catch
  - What is the maximum allowable change in TAC from year to year?
  - What is the minimum acceptable TAC?
  - What is the availability of fish in each country after allocation?

Questions

Stock Status			
Question	**Metrics**	**Current OM**	**Spatial OM**
1) What is the desired status of the stock (i.e., abundance)?	The average stock status over a defined time period	Yes	Yes
	The probability that the stock is above, below, or within a defined range	Yes	Yes
2) What is the desired age structure?	The diversity of age classes	Yes	Yes
	The proportion of older fish to total numbers or biomass	Yes	Yes
	The amount of fish above a certain age are available in each country	No	Yes
	The harvest rate of specific age classes	Yes	Yes
	The age at which the median cumulative harvest occurred.	Yes	Yes
3) What is the desired proportion/availability of biomass or numbers in each country?	The proportion of spawning, exploitable, or other biomass in each country.	No	Yes

Questions

Yield:
The Agreement and the Management Principles do not specifically state any objectives related to yield other than possibly sustainability and intended benefits.

Question	Metrics	Current OM	Spatial OM
4) What is the desired level of catch	The average TAC over a specified time period	Yes	Yes
	The average TAC in each country	No	Yes
5) What is the maximum allowable change in TAC from year to year?	The average annual variability (AAV) of the TAC over a time period	Yes	Yes
	That AAV of the TAC in each country	No	Yes
6) What is the minimum acceptable TAC?	The proportion of times that the TAC was set below a threshold	Yes	Yes
	The proportion of times that the TAC was set below a threshold in each country	No	Yes
7) What is the availability of fish in each country after allocation?	The proportion of times that a specified percentage of exploitable biomass is less than the TAC for each country	No	Yes

Other suggestions for objectives, questions, or metrics?

This is the first, not the last, opportunity for providing feedback

Feedback on how to represent spatial fisheries in operating model?

- What factors determine when to fish?
  - Availability of hake: is there a catch rate below which fishing isn't profitable?

- More opportunities to provide input in the future